

Adolescent Varicocele

NYU Case of the Month, May 2020

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A 16-year-old healthy boy presented with an incidentally diagnosed grade 3 varicocele.

Past medical history: None

Past surgical history: None

Medications: None

Family history: Unremarkable

Physical examination: Tall thin boy

Genitourinary examination: Tanner IV; large left grade 3 varicocele; non-tender; enlarges with Valsalva maneuver

Evaluation and Treatment

An ultrasound (Figure 1) of the testes was performed and provided the following measurements. The right testis was 4.22 cm in length by 2.1 cm in width by 2.55 cm in transverse, yielding a calculated volume of 16.04 cc. The left testis was 3.95 cm in length by 1.73 cm in width by 2.53 cm in transverse, yielding a calculated volume of 12.27 cc. There was a volume discrepancy of 3.77 cc favoring the right testis. The testicular size difference was 23.5%.

To determine the size differential between the testes, the testicular atrophy index is used:

Testicular atrophy index = $[(\text{testicular volume right} - \text{testicular volume left}) \div \text{right testicular volume}] \times 100$

Management

The patient and his family were counseled on their treatment options, which consisted of:

Observation with repeat ultrasound in 1 year

Pro: The patient is asymptomatic and most men with varicoceles do not experience infertility

Con: Some data suggest earlier intervention results in a greater likelihood of equalization of testicular size or “catch-up” growth

Semen analysis

Pro: Provides another data point

Con: As there are no normal levels defined in pubertal children, the interpretation of the data can be difficult. Many patients in this age group are uncomfortable providing a sample

Surgical correction

Pro: The >20% left testicular hypotrophy is an indication for surgery

Con: Surgery may be unnecessary

All three options were discussed at length with the patient and his family. After considering the pros and cons and the risks and benefits of each option, they opted for surgical correction because they were

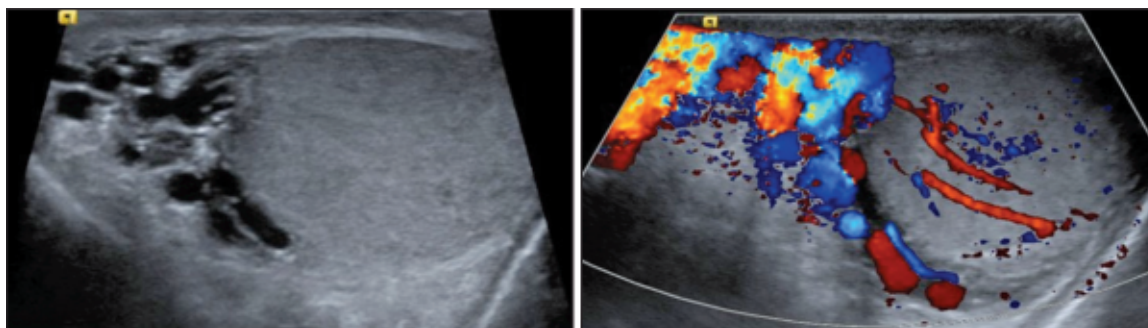


Figure 1. Ultrasonography of the left testicle demonstrating a large varicocele (left). Doppler ultrasonography with Valsalva maneuver (right).

concerned about the presence of significant (>20%) left testicular hypotrophy and the possibility of future infertility. They were not comfortable with the patient providing a semen sample.

A subinguinal varicocelectomy with loupes magnification was completed successfully. The patient had no palpable varicocele on examination 6 months postoperatively. Ultrasound demonstrated growth of both testes, with testicular size equalizing to where the left testicle was 5% smaller than the right.

Comment

A varicocele, the abnormal dilation of the pampiniform plexus, is a common finding in adolescents and adults, occurring in about 15% of boys and men. The etiology and characteristics of a varicocele are the same in both populations, with the left testis more commonly affected than the right.¹ It is hypothesized that varicoceles arise from a combination of increased venous pressure of the left gonadal vein as it inserts into the left renal vein, the presence of collateral veins, and possible valvular insufficiency. As in adults, the finding of a solitary right varicocele is an indication to determine a possible intrabdominal primary cause. Surgical treatment is also the same for both groups. Surgical options include subinguinal microsurgical, open

inguinal, high retroperitoneal, and laparoscopic repair. The differences between adult and adolescent varicoceles lie in the workup and the indications for surgery.

In the adult population, a varicocele is usually treated to correct and reverse infertility. Success is clearly defined as improved semen analysis and, ideally, paternity. In the adolescent, infertility is a nonissue and the most common presentation is an incidental finding by the primary care physician or the patient himself. Less commonly, there is discomfort.

The dilemma with adolescent varicoceles is that although varicoceles are well known to be associated with infertility, 80% of men with varicoceles are fertile.² Therefore, in adolescents, the purpose of varicocele management is to prevent the possibility of infertility and testicular dysfunction.

Although semen analysis is the standard of care for an infertility workup, it is not a standard diagnostic test for adolescents. Apart from the ethical implications of the request, there are no normal semen parameters for teenage boys at different stages of puberty and therefore it is difficult to interpret the results of a semen analysis.

Instead, testicular size has emerged as a surrogate, indirect marker of testicular health. Multiple studies have shown that varicoceles

are associated with testicular hypotrophy, with the implication that the greater the hypotrophy, the less functional the testicle.³

There is also data indicating that early surgical intervention results in left testicular catch-up growth to the right, implying that the varicocele itself deters testicular growth and, in turn, decreases testicular function.⁴

The two main methods of measuring testicular size are with an orchidometer manually or by sonography. Although the first method has been in use longer, the second method has become the standard.

There are many formulas for testicular volume. The most used is the Lambert formula: $L \times W \times H \times 0.71$. The discrepancy in size can be determined by subtracting the left testicle volume from the right testicle volume and dividing the result by the right testicle volume.

As for semen analysis, blood work is also not routinely checked for asymptomatic, incidentally diagnosed varicoceles in adolescents who have no medical or family history significant for endocrine or genetic diseases.

Surgical repair is offered for:

Left testicular hypotrophy of
≥20% or ≥2 mL

Bilateral testicular hypotrophy

Increasing volume discrepancy
during observation
protocol

Discomfort, with the understanding that pain may persist after surgery

Abnormal semen analysis in Tanner V patients

Patient preference: Some do not like the way the varicocele looks or feels

American Urological Association guidelines recommend that adolescents with a varicocele with normal ipsilateral testicular size be offered follow-up monitoring with annual testicular measurements and, if possible, a semen analysis.

The Practice Committee of the American Society of Reproductive Medicine recommends that adolescents with a varicocele and objective evidence of reduced ipsilateral testicular size be offered varicocele repair. Adolescents with a varicocele but normal ipsilateral testicular size should be offered follow-up

monitoring with annual objective measurements of testicular size and/or semen analysis.

The European Association of Urology recommends surgical repair for adolescents with progressive failure of testicular development documented by serial clinical examination.

Surgery

Surgical procedures for adolescents are the same as for adults. Surgical options include subinguinal microsurgical, open inguinal, high retroperitoneal, and laparoscopic repair.

The subinguinal microscopic approach provides the advantage of sparing the artery and the lymphatics. This results in both high success rates and the lowest complication rates, the most frequent complication being hydroceles. However, this approach is the most technically involved.

The ligation of the internal spermatic vessels above the level of the internal inguinal ring is performed by either open or laparoscopic approach, with the latter method gaining in popularity. The added magnification during laparoscopy facilitates artery- and lymphatic-sparing techniques, decreasing hydrocele formation.

Practice patterns among urologists vary widely. The choice of procedure is based on the surgeon's preference and familiarity with a technique. ■

References

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